

**Remarks at JPL Industry Day  
Pasadena, California  
Shana Dale  
Deputy Administrator  
National Aeronautics and Space Administration**

**April 18, 2006**

Thank you Lt. Gen. Tattini (Eugene Tattini, Deputy Director, NASA Jet Propulsion Laboratory) for that very warm introduction and good afternoon ladies and gentlemen. I'm delighted to see such a strong turnout of the industry contractors—big and small—who make JPL such a vibrant center of exploration, discovery and technological innovation.

Today, I wish to speak to you about our bold new vision for space exploration, and how we believe our plans for sustained progress in human and robotic exploration of the moon, Mars and beyond will result in important societal benefits, commercial opportunities, and scientific advancement.

I also want to salute all of the participants in this conference who contribute so greatly to our space program achievements. We value what you do, and we want you to be strong partners with us as this exploration adventure unfolds over a period of decades.

This is a terrific time for me to be talking to you about the work of NASA and JPL, as we have so many activities underway that are helping to expand the frontiers of exploration and discovery.

Today, millions of miles from home the Cassini spacecraft is preparing for another encounter on April 30<sup>th</sup> with Titan, one of Saturn's moons.

Meanwhile, the Mars Reconnaissance Orbiter is just beginning to unleash amazing imagery of the red planet that will intensify as its science mission gets fully underway next fall, pointing out regions that future explorers will certainly want to investigate.

And closer to home, on Friday, we hope to launch from Vandenberg Air Force Base the formation flying CloudSat-Calipso satellites. Once in orbit CloudSat, which is JPL's project, will study clouds on a global basis in order to improve our understanding of the role of clouds in climate change.

All of these missions represent JPL's enormous contributions to NASA's objectives in science and exploration. In thinking about your impressive work, I am reminded of George Will's cogent observation that "JPL may be the only place on the planet where you can gather around a lunch table with people who, in a sense, work on another planet."

Today, I am most pleased that you are attempting to peer over the horizon to survey what future technologies we can bring to bear as we open up the entire solar system to human and robotic exploration and commercial enterprise. I also am gratified that you are discussing opportunities that exist for collaboration between JPL and industry on future space missions vital to our agency's and our country's aspirations.

In this business one can and must look at technology development in two ways. First, we require new technologies to conduct the ambitious new missions that will allow humanity to see things never seen before and to do things never done before. Second, the promising technologies that we will develop through our NASA-industry partnership, hold the promise of serving as an engine of economic growth and progress throughout America.

President Bush made both of these points when he presented NASA and the nation with the defining challenge of expanding our reach throughout the solar system two years ago. He said, "We have undertaken space travel because the desire to explore and understand is part of our character. And that quest has brought tangible benefits that improve our lives in countless ways. The exploration of space has led to advances in weather forecasting, in communications, in computing, search and rescue technology, robotics, and electronics. Our investment in space exploration helped to create our satellite telecommunications network and the Global Positioning System."

As we move forward in implementing a sustainable and affordable program designed to ensure American leadership in 21<sup>st</sup> century space activities, we are quite confident our work will spur technological developments leading to new products and services that tangibly improve the lives of people throughout the world.

Administrator Mike Griffin and I believe the technology development necessary to implement the President's vision will accelerate advances in robotics, autonomous and fault tolerant systems, human-machine interface, materials, life-support systems and novel applications of nanotechnology as well as microdevices.

If history is any guide, these and other technologies developed through the space program will have a dramatic impact on society in many unanticipated ways. In thinking about this mission-required technology development, I'm reminded of Norman Cousins' observation that "progress begins with the belief that what is necessary is possible."

Now let me address how JPL and its contractors fit into the technological development that we want to occur. First, it's important to point out that we are taking an agency-wide and industry-wide approach to the goals of the Vision for Space Exploration. All NASA Centers will contribute to the missions that lie in the future. We are a team at NASA and JPL is very much a part of that team.

Second, we intend to cast a wide net to obtain new and useful technologies from emerging entrepreneurial companies as well as from the traditional aerospace industry.

In doing so, we will aggressively pursue synergies between those working on the human-rated aspect of spaceflight, and those involved in robotic elements. There is a somewhat artificial distinction between human and robotic spaceflight which is unnecessary. To provide you one obvious example, JPL has wonderful experience with developing rovers that can be applied to both human and robotic uses. And I understand that currently JPL is working on an impressive six-legged rover design called Athlete that can move through rough terrain and deploy habitats or other surface equipment.

Other areas in which we've identified a clear role for JPL to take a leading role in technology development for the Vision for Space Exploration include electronics and batteries that can withstand extreme temperature and radiation environments as well as environmental monitoring and control systems.

Yes, we have high expectations for JPL and its contractors, and in many ways these expectations are based on your excellent track record. Last year, JPL won a record dollar amount of NASA Space Act Awards which we bestow on our best and brightest innovators. A very impressive 45 percent of these awards went right here to JPL, with over 1,300 individual awards received by JPL's staff and 51 patents issued to

Caltech or NASA, based on JPL technologies. And I know that JPL is very eager to work with industry to license some of these innovative technologies.

In this regard, I would like to congratulate JPL's technology licensing program, which the National Academy of Public Administration singled out for managing the most sophisticated effort under our agency's Innovative Technology Transfer program. Let me give you a couple examples of their output. The E-Tongue, a sensor originally created as a water quality monitor for the International Space Station, was transferred to a company that is working to develop it as a general-purpose lab instrument, with possible homeland security applications. And JPL's Blackjack Global Positioning System receiver, which achieves about ten times better accuracy than typical GPS receivers on the market, was transferred to a company that is developing it commercially.

I'm also impressed that in order to keep up its technological edge, last year JPL created for the first time a strategic technology plan. This blueprint singles out a dozen technologies critically important to NASA's overall exploration goals.

Please allow me to mention some other key technologies. Our plan for implementing the Vision for Space Exploration starts with the recognition that the largest "barrier to entry" for lunar and Mars exploration will be the size and cost of the transportation systems

required to take people beyond Earth orbit. And that's why we are making a strategic investment in a new generation of spacecraft, launch and cargo vehicles that will replace the current Shuttle system, under our Project Constellation development effort.

But lest you think NASA's new space transportation system is a tool only for human spaceflight, think about what Constellation-enabled science we could conduct at Mars with access to a 110 metric ton launch capability. I understand our people at JPL just undertook a three day study of this issue, and they came back with jaw-dropping scenarios, including sending five sample return missions to the planet in one vehicle, and mounting a mission to demonstrate an in situ resource utilization prototype. During the course of this brief brainstorming exercise, I'm told people asked questions we've never dared ask because we've never had these capabilities. And we certainly want industry to join us in opening up the floodgates for new ideas to take advantage of these systems.

Indeed, we are just at the beginning stages of defining the strategies and missions we will pursue in implementing the Vision for Space Exploration. Next week, for example, NASA is hosting in Washington a workshop for the development of lunar strategies with the aim of generating ideas for international, academic and commercial objectives when the next great era of lunar exploration gets underway.

At this workshop, which represents one of many activities we are sponsoring this year to develop the essential ideas for what we will do when we return to the moon, we look forward to hearing from some of the best strategic thinkers from 12 participating countries and the European Space Agency, and from industry and academia. Among the NASA experts who will be leading the workshop discussions are JPL's Brent Sherwood and Dave Beaty (*Bay-tee*). The reason why they were selected for this role is that they have extensive experience in Mars science planning, and they are able to articulate with great skill the relationship between what we can achieve with lunar science investigations and science on Mars.

Again, this workshop is one of many idea-gathering instruments we intend to incorporate in the weeks and months ahead as we develop our exploration strategy. For instance, last week our Exploration Systems Mission Directorate issued a Request for Information for all comers to present us their best ideas on science, operational and technology research activities that could be pursued on the moon as part of an integrated global exploration strategy. Based on a 25-year time horizon, the RFI is asking submitters to address one or more of the following key elements:

- Lunar exploration activities that are an integral part of a broader exploration strategy encompassing Mars and other destinations.

- Lunar robotic activities that collect key strategic information and develop key capabilities to enable and enhance human exploration.
- Lunar activities that enable humans to live and work productively on the moon, including developing and using lunar resources.
- Activities that enable opportunities for international collaboration.
- Characterization of opportunities for lunar science investigations.
- Activities to enable lunar commerce.
- And activities that can engage the general public in lunar exploration.

As implied by this list, it is not NASA's intent to dictate what will take place on the moon, or on any other exploration destination. We want to work collaboratively with our international, commercial and academic partners to figure out how we can leverage the transportation capabilities NASA is developing to obtain the widest possible benefits in terms of exploration, science and commerce. And I encourage all participating in this industry day to take a look at this Request for Information and present us your best ideas. The deadline for your submittals is May 12th.

In closing, I wish to thank all of you for participating in JPL's Industry Briefing. I am tremendously impressed by what is going on here. I'd also like to thank you for your dedication to helping this institution, founded by one of the 20<sup>th</sup> century's greatest innovators Theodore Von Karman, remain and excel as one of the leading lights of exploration, discovery and innovation in the 21<sup>st</sup> century. Thank you again for your warm welcome.